WHAT IS CLAIMED IS:

1. A method of measuring a response to a stimulus of a plurality of samples spots of a sample using a measuring system having a measurement range to generate an image of the sample in digital space, the method comprising:

for each sample,

while measuring the response, varying the stimulus to include at least one stimulus value where the measured response corresponds to a value in an intermediate portion of the measuring range, and

storing a value of the measured response that corresponds to a value in the intermediate portion of the measurement range, and the stimulus value that produced that value of the measured response.

2. The method of claim 1, and further comprising dividing each stored value of the measured response by the corresponding stimulus value to provide a normalized-response value.

3. The method of claim 2, and further comprising, for each normalized-response value, multiplying each normalized-response value by a highest stimulus value that is stored to generate the image, wherein these normalized-response values that are multiplied by the highest stimulus value that is stored are referred to as the image spots.

4. The method of claim 3, wherein the image spots form the image in digital space.

5. The method of claim 3, wherein the steps of varying the stimulus and storing the value of the measured response are performed in one scan of the sample.

6. The method of claim 5, wherein the scan includes a raster scan of each row of the sample spots.

7. The method of claim 3, wherein the image includes a microarray image of a microarray.

8. The method of claim 3, wherein the measuring system includes an A/D converter having a particular number of bits that accommodates a particular range of response values.

9. The method of claim 8, wherein at least one of the image spots has a number of bits that exceeds the particular number of bits of the A/D converter.

10. The method of claim 1, wherein a variation of the measured responses over the plurality of samples exceeds the measurement range.

11. The method of claim 1, wherein varying the stimulus includes increasing the stimulus over a range.

12. The method of claim 11, wherein increasing the stimulus includes increasing the intensity of laser radiation.

13. The method of claim 1, wherein for multiple ones of the plurality of sample spots, the value in the intermediate portion of the measurement range is approximately the same value.

14. The method of claim 1 wherein:

the samples spots are regions having probes hybridized with targets having fluorescent tags;

the stimulus is visible or UV optical radiation; and

the response is a level of fluorescent emission.

15. The method of claim 14, wherein the stimulus is laser radiation.

16. The method of claim 1 wherein:

the stimulus is electromagnetic radiation; and

the response is a level of reflected radiation or transmitted radiation.

17. A method of acquiring image-response values for an extended sample subjected to a stimulus to generate an image in digital space that includes the image-response values, the method comprising:

for each of a plurality of spots,

subjecting the sample to a plurality of stimulus values in a single scan of the spots,

measuring corresponding response values,

determining a stimulus value that provides a response value within a desired range, and

storing the stimulus value, so determined, and the response value provided by that stimulus value;

providing a normalized data set for the plurality of spots where each spot's normalized value represents a ratio of the stored response value and the corresponding stimulus value.

18. The method of claim 17, wherein the step of providing the normalized data set for the plurality of spots includes multiplying the normalized values by a highest stored stimulus value, and these values are the image-response values.

19. The method of claim 17, wherein the desired range is an intermediate range of an A/D converter having a particular number of bits that accommodates a particular range of response values, and at least one of the image-response values has a number bits that exceeds the particular number of bits of the A/D converter.

20. A method for generating a microarray image of a sample that includes a plurality of microarray spots irradiated with laser radiation, such that radiation from each microarray spot is a response to being irradiated, the method comprising:

for each microarray spot in a single scan of the microarray:

varying an intensity value of the laser radiation within a range of values,

storing a radiation value for the radiation, and a corresponding intensity value for that radiation value, wherein the radiation value is below a saturation level of a detector, and

dividing the stored radiation value by the stored intensity value to generate a normalized-radiation value; and

multiplying the normalized-radiation values by a highest radiation value that is stored.

21. The method of claim 20, wherein the detector includes an A/D converter configured to generate the radiation values, and the saturation level is a saturation level of the A/D converter.

22. The method of claim 21, wherein the normalized-radiation values multiplied by the highest radiation value this is stored are independent of a measurement range of the A/D converter.

23. The method of claim 20, wherein the stored radiation values are in a central portion of a measurement range of the detector.

24. The method of claim 20, wherein the stored radiation values vary by about +/- 20%.

25. The method of claim 20, wherein the detector includes a radiation-detection that is at least one of a photomultiplier tube, an avalanche photodiode, a CCD (charge coupled device) array, a CMOS (complementary metal oxide) array.

26. The method of claim 20, wherein the stored radiation values are approximately the same.

27. The method of claim 20, wherein the laser radiation is excitation-laser radiation, and the radiation is fluorescent radiation.

28. The method of claim 27, wherein the excitation-laser radiation has a first wavelength and a second wavelength.

29. The method of claim 28, wherein the first wavelength is a red wavelength and the second wavelength is a green wavelength.

30. The method of claim 28, wherein:

the microarray image includes a first microarray image and a sub-microarray image,

the first microarray image is associated with the first wavelength, and

the sub-microarray image is associated with the second wavelength.

31. The method of claim 20, wherein the radiation is backscattered radiation.

32. The method of claim 20, wherein the step of storing the radiation value includes storing the radiation values and the intensity values in a memory at memory addresses that correspond to coordinate positions of the microarray spots on the sample.

33. The method of claim 20, further comprising digitally operating on the normalized-radiation values with a mathematical function.

34. An image generator for generating a digital-space image of a sample comprises:

a radiation source configured to generate radiation and irradiate sample spots of the sample, wherein the sample spots radiate in response to being irradiated;

a modulator configured to modulate an intensity of the radiation;

a detector having a measurement range and configured to generate radiation values from the radiation from the sample spots;

a memory configured to store a radiation value that corresponds to an intermediate portion of the measurement range, and a radiation value for the generated radiation that corresponds to that radiation value; and

a processor configured generate image spots of the digital-space image by normalizing the stored radiation values by their associated radiation values of the generated radiation and multiplying these values by a highest radiation value of the generated radiation this is stored the digital-space image.

35. The generator of claim 34, wherein the detector includes an analog-to-digital (A/D) converter configured to generate the radiation values, and the intermediate portion of the measurement range is an intermediate portion of the measurement range of the A/D converter.

36. The generator of claim 35, wherein the A/D converter has a particular number of bits that accommodates a particular range of radiation values.

37. The generator of claim 36, wherein at least one of the image spots has a number bits that exceeds the particular number of bits of the A/D converter.

38. The method of claim 35, wherein the image spots are independent of a measurement range of the A/D converter.

39. The generator of claim 35, wherein the detector includes a radiation-detection configured to detect the radiation, and the radiation detector includes at least one of a photomultiplier tube, an avalanche photodiode, a CCD (charge coupled device) array, and a CMOS (complementary metal oxide) array.

40. The generator of claim 39, and further comprising an amplifier-filter module configured to amplify and filter output of the radiation detector and provide amplified and filtered output to the A/D converter.

41. The generator of claim 34, wherein the processor is configured to multiply the normalized-radiation values by a highest laser-radiation value to generate the microarray image.

42. The generator of claim 34, wherein the processor is a RISK (reduced instruction set) microprocessor.

43. The generator of claim 34, wherein the intensity modulator includes at least one of an electrooptic modulator disposed between a pair of crossed polarizers, an acoustooptic modulator, and a controllable variable-neutral-density filter.

44. The generator of claim 34, and further comprising a lens system configured to focus the laser radiation on the sample spots and collect the radiation from the sample spots for collection by the detector.

45. The generator of claim 34, and further comprising a second laser configured to irradiate the sample spots with laser radiation having a wavelength different from the laser radiation of the first mentioned laser to generate a second microarray image.

46. A method for generating an image of a sample that includes a plurality of spots irradiated with stimulus radiation, such that response radiation from each spot is a response to the stimulus radiation, the method comprising:

for each spot, in a single scan of the sample:

varying an intensity value of the stimulus radiation within a discrete range of values,

storing a radiation value for the response radiation and an attenuation state for that radiation value, wherein the radiation value is within a measurement range of a detector, and each attenuation state is associated an attenuation value, and

normalizing the radiation values based on the attenuation values to form the image in digital space.

47. The method of claim 46, wherein the detector includes an A/D converter configured to generate the radiation values, and the measurement range is above a measurement level.

48. The method of claim 47, wherein the measurement level is at least ten percent above a threshold level of the A/D converter.

49. The method of claim 46, wherein the stimulus radiation is laser radiation, and the response radiation is fluorescent radiation.

50. The method of claim 46, wherein the response radiation is backscattered radiation.

51. The method of claim 46, wherein the step of storing the radiation value includes storing the radiation values in a memory at memory addresses that correspond to coordinate positions of the spots on the sample.

52. The method of claim 46, further comprising digitally operating on the image with a mathematical function.